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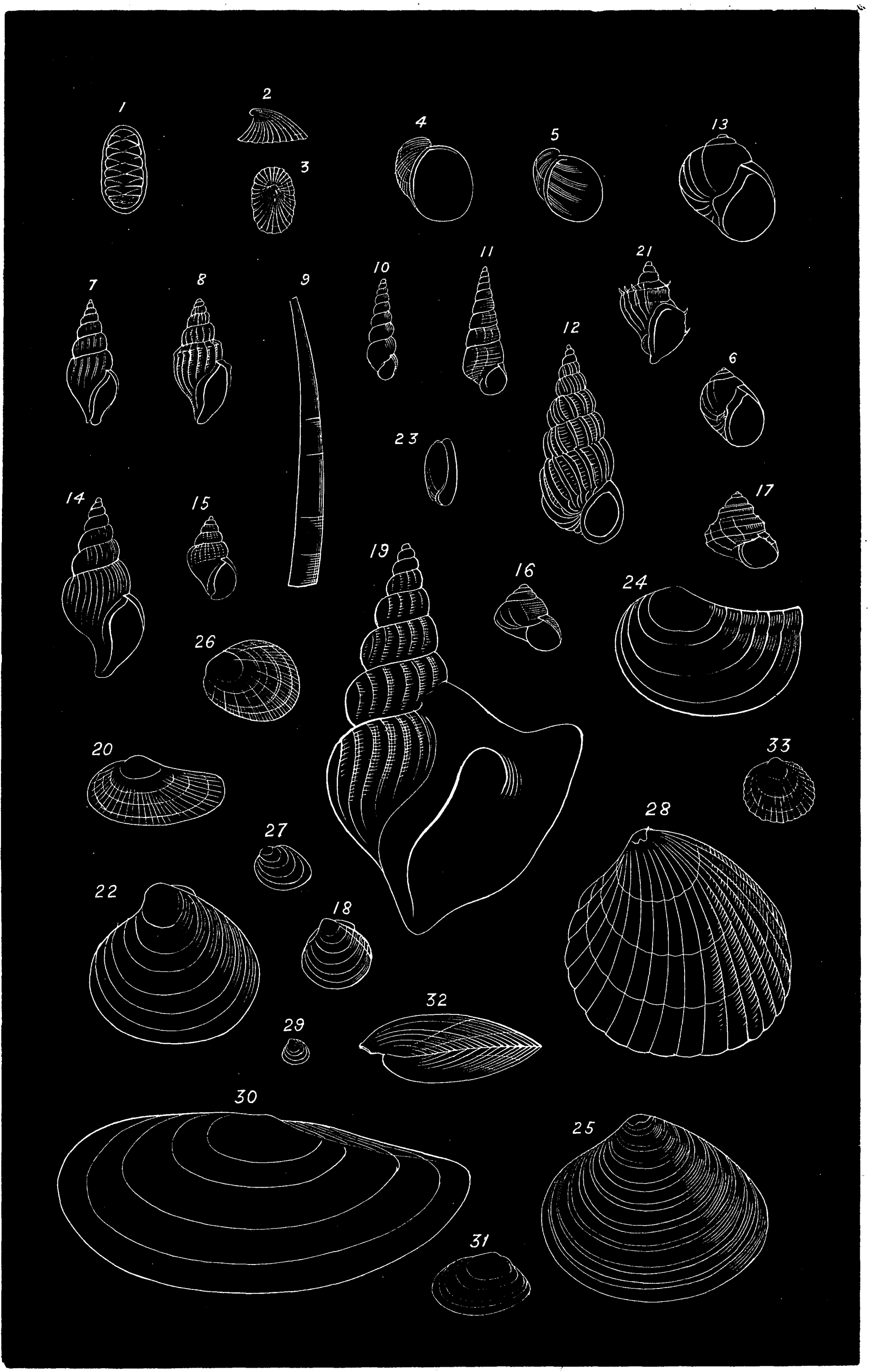


NOTES ON SHELL DREDGING.

Thus ends our history of these cancrine crustacea, as the naturalists call them, namely, the crabs. Our hope has been that the reader does not regard it as crusty, cancer-ous, or crabbed.

SHELL DREDGING.

BY EDWARD S. MORSE.

A STRONG arm and an immunity from sea-sickness are among the important requisites of a good dredger. To one who has pulled up a well-filled dredge from fifteen or twenty fathoms, the necessity of a strong arm is obvious, especially if this act has been attended with the not unusual accompaniments of a rough sea, and a cold breeze which stiffens the fingers while grasping the wet rope. One can only pity those who are sea-sick, for they are helpless.

In dredging one oftentimes enjoys the keenest pleasure, attended with the greatest bodily discomforts. The miseries we will not mention. The delights come when the contents of the dredge are sifted, and there lies before you the only treasures of the deep; treasures that can be obtained in no other way. It is true that many deep-water species of shells are obtained from the stomachs of the haddock, cod and other fishes, particularly from the haddock, which seems to live principally on mollusks. Specimens procured from this source are generally impaired by the action of the juices of the stomach. The beauty of dredging consists in getting the objects in their living condition; and then you may keep them alive in sea-water for some time, and see them crawl about and watch their singular ways.

A dredge should not be too large, perhaps sixteen inches across the mouth. The frame is made of a flat bar of iron, an inch in width and an eighth of an inch in thickness, one edge of which should be hammered sharp and turned out, to form the scraping edge, as represented in the cut at the close of this article. The other edge must be drilled with small holes an inch apart, to which a stout cloth bag is to be sewed. It is well to have the sides of the bag made of netting so that the water may drain from it quickly. The iron shanks are to be fastened to the dredge, as shown in the figure. A dredge of this shape, however it falls, when drawn slowly along, is sure to scrape up the mud. It is well to have for a rope a good strong one of manila-hemp, and this should be well secured to the dredge. It is necessary to have the length of the rope more than twice the depth you intend to dredge in; thus, if you were to dredge in ten fathoms, you should be provided with at least twenty-five fathoms of rope, as it is necessary to give the dredge sufficient "slack" in order that it may drag properly. Should the dredge meet with any obstacle, it can generally be liberated by retracing the track passed over, dragging the dredge in an opposite direction. It is well to add that a row-boat is best to dredge from, that is for light dredges, as you want to move very slowly through the water. A fine sieve is necessary to sift out the mud, a few pails in which to empty the contents of the dredge, and some large-mouthed vials in which to save the animals alive.

After a little experience in dredging you will notice that certain species live on certain "bottoms." Thus, if your dredge comes up filled with mud, you must sift the mud carefully, and from it you will find certain forms different from those you may dredge from a sandy bottom. It is well to examine your sieve often, that the smaller species may not be washed away. Sometimes the dredge will come up filled with stones; do not throw these away in disgust, but examine each stone carefully, and clinging to them you will find several species of shells found in no other way. One species, called *Cemoria Noachina* (Pl. 4, figs. 2, 3), is like a very small limpet, with a little hole in its top from which radiate little ribs, giving the shell a very elegant appearance under the magnifier. Then there are certain species of shells (Chiton, Pl. 4, fig. 1) which cling to the stones, limpet-like, but instead of having a shell of one piece covering their back, the shell is composed of eight transverse pieces, one lapping over the other. When detached from the rock they often roll up like a pill-bug. On the eastern coast of Maine there is one large species which can be taken from the rocks at low-water mark. The species dredged in Massachusetts Bay are generally small; one or two of them are brightly colored with shades of red.

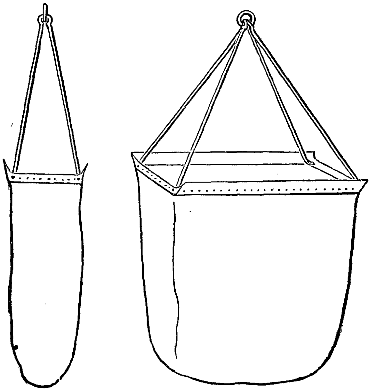
Two other species called Velutina (Pl. 4, figs. 4, 5) are often found adhering to the rocks brought up in this manner. By far the most beautiful and interesting animals are contained in the little cells which often cover the rocks from deep water. They are arranged in little patches like mats, some species making a perfectly circular figure, others covering the rocks in irregular patches. These belong to the lowest group of mollusks, and are called Polyzoa. Under the microscope the mass is seen composed of little cells, arranged like the stones in a pavement. Each one of these cells has a little opening protected by a small lid, which opens to allow the animal within to protrude a tuft of minute feelers. It would require too long a time to show the affinity of these animals to the clam and oyster, yet they are among the lowest forms of this group. There are many species on our coast, some of which have been described as new, others are similar to British species.

We figure on Plate 4 several species of shells one is likely to dredge on our New England coast, though representing but a small portion of the species that may be found, and we may mention here, with propriety, that the State of Massachusetts—with that liberality that has always characterized the acts of its legislature—has now in preparation a new edition of "Gould's Report on the Invertebrate animals of the State." This book, when published, will contain carefully engraved figures of all the species of shells found within its limits, and the marine species alone (containing all the animals that belong to the branch of mollusca, though many have no hard calcareous shells) number three hundred and sixteen. Several of these are cuttle-fishes, and there are many mollusks which have no shells, the branchiæ or gills being naked; hence they are called Nudibranchia. They comprise the most beautiful animals in the branch of Mollusca, for certain species are very brilliantly colored.

The species figured on the plate are among the few that the collector is likely to bring up while dredging in our bays and inlets, in depths of from ten to fifteen fathoms. Should he be ambitious to throw his dredge into depths of fifty or one hundred fathoms, many other species will be secured that he could not get in water of less depth.

The outlines given will be found sufficiently accurate to enable the collector to identify the species represented. Fig. 1 represents *Chiton albus*; the shell is not quite half an inch in length; it is generally a dead white color. Figs. 4 and 5 represent *Velutina haliotoides* and *V. zonata*, the latter differing from the former in having a more solid shell, and in having the shell marked with bands of brown. Fig. 6 is the *Natica immaculata*, a pure white shell of the size represented; very common. Fig. 13 represents another species, *Natica clausa;* color from a white to a dark reddish brown. The little lid that closes the aperture of most marine shells is in this species white and shelly, and not of the horny consistency characterizing the opercula of most shells in our region. *Pandora trilineata* (Fig. 24) is easily distinguished by its white pearly color, and the manner in which the valves are pressed together. *Lyonsia hyalina* (Fig. 20) has a very fragile translucent shell covered with radiating wrinkles. *Thyasira Gouldii* (Fig. 18) has a delicate white shell, along one margin of which is a deep fold. The shell of *Astarte castanea* (Fig. 22) is quite solid, and chestnut-colored. It is found abundantly in Provincetown harbor at low water. *Astarte sulcata* (Fig. 25) is known by its strongly marked concentric ridges. The color in young specimens is very light-brown; in old ones the shell is of a brownish olive color. *Cardita borealis* (Fig. 28) has a brownish shell with the ribs crenulated. *Cardium pinnulatum* (Fig. 33) has a dingy white shell, ornamented with about twenty-five ribs, each of which has a series of little scales. *Yoldia limatula* (Fig. 30) has a beautifully polished shell, of a light green color. The hinge is complicated by a number of long sharp teeth, so closely interlocked, that it is difficult to separate the valves without breaking them. *Tellina tenera* (Fig. 31) has a white iridescent shell. *Nucula tenuis* (Fig. 27) is smooth and green in color. *Nucula delphinodonta* (Fig. 29) is brownish green. All the Nuculas have the same peculiar hinge of numerous interlocking teeth. *Crenella glandula* (Fig. 26) has a brownish yellow shell, marked with minute radiating lines. *Terebratulina septentrionalis* (Fig. 32), though apparently related to the other bivalves, is widely different from them and belongs to another order; the shell is secured to the bottom, generally on stones, by a fleshy peduncle which passes through a hole in the upper valve. *Dentalium striolatum* (Fig. 9) has a shell like a long curved tapering tube. *Scalaria Grœnlandica* (Fig. 12) has a shell that looks more like a tropical species than a denizen of our cold northern waters. The shell is very attractive, with its turreted spire banded by prominent ribs. It is related to the foreign species, commonly called the "Wentle trap," which formerly brought fabulous prices among shell collectors. *Margarita undulata* (Fig. 16) is one of our most beautiful marine shells. The color of the shell when fresh is rose-red with a pearly lustre. Another species of this genus, *Margarita cinerea* (Fig. 17), is ashy white. There are several species on the coast, and all are so characteristic that they can be easily identified. *Cylichna alba* (Fig. 23) is bluish white. *Turritella erosa* (Fig. 11) has a pale brown shell, and *Odostomia producta* (Fig. 10) has a light brown-colored shell. *Bela harpularia* (Fig. 7) is brownish in color, and *Bela turricula* (Fig. 8) is thin and pure white. *Tritonium pygmœum* (Fig. 14) is yellowish white. *Admete viridula* (Fig. 15) is white. *Trichotropis borealis* (Fig. 21) is yellowish in color. *Aporrhais occidentalis* (Fig. 19) is one of the most singular shells that we have. It is rare on our coast, but is common towards Newfoundland.

We must bear in mind that the species mentioned are a few among the many that most likely will be collected in dredging on our coast.



Dredge.

EXPLANATION OF PLATE IV.

Fig. 1. *Chiton albus* Linn.
Figs. 2, 3. *Cemoria noachina* Linn.*
Fig. 4. *Velutina haliotoides* Müll.
Fig. 5. *Velutina zonata* Gould.
Fig. 6. *Natica immaculata* Totten.
Fig. 7. *Bela harpularia* Couthouy.
Fig. 8. *Bela turricula* Mont.
Fig. 9. *Dentalium striolatum* Stimpson.
Fig. 10. *Odostomia producta* Adams.*
Fig. 11. *Turritella erosa* Couth.
Fig. 12. *Scalaria Grœnlandica* Perry.
Fig. 13. *Natica clausa* Sowerby.
Fig. 14. *Tritonium pygmœum* Gould.
Fig. 15. *Admete viridula* Fabr.
Fig. 16. *Margarita undulata* Sby.
Fig. 17. *Margarita cinerea* Couth.
Fig. 18. *Cryptodon Gouldii* Phil.*
Fig. 19. *Aporrhais occidentalis* Beck.
Fig. 20. *Lyonsia hyalina* Conrad.
Fig. 21. *Trichotropis borealis* Sby.
Fig. 22. *Astarte castanea* Say.
Fig. 23. *Cylichna alba* Brown.
Fig. 24. *Pandora trilineata* Say.
Fig. 25. *Astarte sulcata* Mont.
Fig. 26. *Crenella glandula* Tott.
Fig. 27. *Nucula tenuis* Mont.
Fig. 28. *Cardita borealis* Conrad.
Fig. 29. *Nucula delphinodonta* Mighels.
Fig. 30. *Yoldia limatula* Say.
Fig. 31. *Tellina tenera* Say.*
Fig. 32. *Terebratulina septentrionalis* Couth.
Fig. 33. *Cardium pinnulatum* Conrad.

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* Enlarged twice.